We Claim:

1.   A method for compressing received data comprising a first received component and a second received component, the method comprising:

(a)   converting the first received component to a first converted component in accordance with a first statistical characteristic of the first received component; and

(b)   converting the second received component to a second converted component in accordance with a second statistical characteristic of the second received component,

wherein a resolution of at least one of the converted components is reduced with respect to a corresponding received component.

2.   The method of claim 1, further comprising:

(c)   determining the first statistical characteristic associated with the first received component and the second statistical characteristic associated with the second received component.

3.   The method of claim 1, wherein a first resolution of the first converted component and a second resolution of the second converted component are reduced with respect to the first received component and the second received component, respectively.

4.   The method of claim 1, wherein (a) comprises mapping the first received component to one of a first plurality of bins in accordance with the first statistical characteristic in order to form the first converted component and (b) comprises mapping the second received component to one of a second plurality of bins in accordance with the second statistical characteristic in order to form the second converted component.

5.   The method of claim 1, wherein the first received component corresponds to an In-phase (I) component and the second received component corresponds to a received Quadrature (Q) component.

6.   The method of claim 1, wherein the first statistical characteristic and the second statistical characteristic are essentially the same.

7.   The method of claim 6, wherein one of the first and second statistical characteristics is approximated by another of the first and second statistical characteristics.

8.   The method of claim 2, wherein (c) comprises:

(i)   determining the first statistical characteristic from a first plurality of data points that are associated with the first received component; and

(ii)   determining the second statistical characteristic from a second plurality of data points that are associated with the second received component.

9.   The method of claim 1, further comprising:

(c)   transforming the first received component and the second received component into a magnitude component and a phase component;

(d)   selecting a first number of bits from the magnitude component and a second number of bits from the phase component; and

(e)   forming the first converted component and the second converted component from the first number of bits and the second number of bits.

10.   The method of claim 1, further comprising the steps of:

(c)   transforming the first converted component into a first transformed component and the second converted component into a second transformed component; and

(d)   quantizing the first transformed component into a first quantized transform and the second transformed component into a second quantized transform.

11.   The method of claim 10, further comprising:

(e)   encoding the first quantized transform into a first compressed component and the second quantized transform into a second compressed component.

12.   The method of claim 10, wherein (d) utilizes a quantization conversion table that is determined by a statistical characterization of the first and second transformed components.

13.   The method of claim 10, wherein (d) utilizes a quantization conversion table that is determined by a heuristic process.

14.   The method of claim 10, wherein (d) utilizes a quantization conversion table that is determined by a statistical characterization of the first and second transformed components and by a heuristic process.

15.   The method of claim 1, wherein the received data comprises synthetic aperture radar (SAR) data.

16.   The method of claim 4, wherein bins of the first plurality of bins and the second plurality of bins are assigned in accordance with a distribution of data points.

17.   The method of claim 1, wherein the first statistical characteristic comprises a first Probability Density Function (PDF) that is associated with the first received component and the second statistical characteristic comprises a second Probability Density Function (PDF) that is associated with the second received component.

18.   The method of claim 17, wherein a first width of a first bin is inversely related to a first value of the first probability density function, and wherein a second width of a second bin is inversely related to a second value of the second probability density function.

19.   The method of claim 4, wherein (a) is based upon a first dynamic range that is associated with the first received component and (b) is based upon a second dynamic range that is associated with the second received component.

20.   A computer-readable medium having computer-executable instructions for performing the steps recited in claim 1.

21.   A computer-readable medium having computer-executable instructions for performing the steps recited in claim 2.

22.   An apparatus for compressing received data, the received data comprising a first received component and a second received component, the apparatus comprising:

a preprocessor that converts the first received component into a first converted component in accordance with a first statistical characteristic of the first received component and the second received component into a second converted component in accordance with a second statistical characteristic of the second received component, wherein a resolution of at least one of the converted components is reduced with respect to a corresponding received component;

a transform module that transforms the first converted component into a first transformed component and the second converted component into a second transformed component; and

a quantizer that obtains an indicator from the preprocessor about a data type of the received data, selects a quantization conversion table in accordance with the indicator, and quantizes the first transformed component into a first quantized transform and the second transformed component into a second quantized transform by utilizing the quantization conversion table.

23.   The apparatus of claim 22, wherein the preprocessor further determines the first statistical characteristic associated with the first received component and the second statistical characteristic associated with the second received component.

24.   The apparatus of claim 22, further comprising:

an encoder that removes a degree of redundancy from the first quantized transform to form a first compressed component and from the second quantized transform to form a second compressed transform.

25.   A method for decompressing data in order to approximate original data, the original data comprising a first original component and a second original component, the method comprising the steps of:

(a)   obtaining a first converted component and a second converted component;

(b)   converting the first converted component into a first decompressed component in accordance with a first statistical characteristic of the first original component; and

(c)   converting the second converted component into a second decompressed component in accordance with a second statistical characteristic of the second original component, wherein at least one of the decompressed components comprises a greater number of bits than a corresponding converted component.

26.   The method of claim 25, wherein the first decompressed component and the second decompressed component comprise a larger number of bits than the first converted component and the second converted component, respectively.

27.   The method of claim 25, wherein (b) comprises mapping the first converted component to the first decompressed component from a first plurality of bins in accordance with the first statistical characteristic and (c) comprises mapping the second converted component to the second decompressed component from a second plurality of bins in accordance with the second statistical characteristic.

28.   The method of claim 25, wherein the first original component corresponds to a received In-phase (I) component and the second original component corresponds to a received Quadrature (Q) component.

29.   The method of claim 25, wherein the first statistical characteristic comprises a first probability density function that is associated with the first original component, and wherein the second statistical characteristic comprises a second probability density function that is associated with the second original component.

30.   The method of claim 25, wherein the original data comprises synthetic aperture radar (SAR) data.

31.   The method of claim 25, further comprising:

(d)   converting the first converted component and the second converted component into a magnitude component and a phase component; and

(e)   forming the first decompressed component and the second decompressed component from the magnitude component and the phase component.

32.   The method of claim 25, wherein (a) comprises:

(i)   obtaining a first quantized transform and a second quantized transform of compressed data;

(ii)   inverse quantizing the first quantized transform into a first transformed component and the second quantized transform into a second transformed component; and

(iii)   inverse transforming the first transformed component into the first converted component and the second transformed component into the second converted component.

33.   The method of claim 32, wherein (i) comprises:

(1)   obtaining a first compressed component and a second compressed component; and

(2)   decoding the first compressed component into the first quantized transform and the second compressed component into the second quantized transform.

34.   A computer-readable medium having computer-executable instructions for performing the steps recited in claim 25.

35.   An apparatus for decompressing data, comprising:

an inverse quantizer that obtains a first quantized transform and a second quantized transform, obtains an indicator about a data type that is associated with the data, selects a quantization conversion table in accordance with the indicator, and inverse quantizes the first quantized transform into a first transformed component and the second quantized transform into a second transformed component;

an inverse transform module that inverse transforms the first transformed component into a first converted component and the second transformed component into a second converted component; and

an inverse preprocessor that converts the first converted component into a first decompressed component and the second converted component into a second decompressed component, wherein at least one of the decompressed components comprises a greater number of bits than a corresponding converted component.

36.   The apparatus of claim 35, further comprising:

a decoder that obtains a first compressed component and a second compressed component and that converts the first compressed component into the first quantized transform and the second compressed component into the second quantized transform.

37.   A method for compressing received data comprising a received component, the method comprising:

(a)   determining a statistical characteristic associated with the received component; and

(b)   converting the received component to a converted component in accordance with the statistical characteristic, wherein a resolution of the converted component is reduced with respect to the received component.

38. The method of claim 37, wherein the received data further comprises another received component, the method further comprising:

(c) determining another statistical characteristic associated with the other received component; and

(d) converting the other received component to another converted component in accordance with the other statistical characteristic, wherein an associated resolution of the other converted component is reduced with respect to the other received component.

39. An apparatus for compressing received data, the apparatus comprising:

a preprocessor that determines a statistical characteristic associated with a received component and that converts the received component into a converted component in accordance with the statistical characteristic, wherein a resolution of the converted component is reduced with respect to the received component;

a transform module that transforms the converted component into a transformed component; and

a quantizer that obtains an indicator from the preprocessor about a data type of the received data, selects a quantization conversion table in accordance with the indicator, and quantizes the transformed component into a quantized transform by utilizing the quantization conversion table.

40. The apparatus of claim 39, further comprising:

an encoder that removes a degree of redundancy from the quantized transform to form a compressed component.

41. A method for decompressing data in order to approximate original data, the original data comprising an original component, the method comprising:

(a) obtaining a converted component;

(b) determining a statistical characteristic that is associated with the original component; and

(c) converting the converted component into a decompressed component, wherein the decompressed component comprises a greater number of bits than the converted component.

42.   The method of claim 41, wherein the original data comprises another original component, the method further comprising:

(d)   obtaining another converted component;

(e)   determining another statistical characteristic that is associated with the other original component; and

(f)   converting the other converted component into another decompressed component, wherein the other decompressed component comprises a larger number of bits than the other converted component.

43.   An apparatus for decompressing data, comprising:

an inverse quantizer that obtains a quantized transform, obtains an indicator about a data type that is associated with the data, selects a quantization conversion table in accordance with the indicator, and inverse quantizes the quantized transform into a transformed component;

an inverse transform module that inverse transforms the transformed component into a converted component; and

an inverse preprocessor that converts the converted component into a decompressed component, wherein the decompressed components comprises a greater number of bits than the converted component.

44.   The apparatus of claim 43, further comprising:

a decoder that obtains a compressed component and that converts the compressed component into the quantized transform.

45.   The method of claim 37, wherein the received data comprises acoustic data.

46.   The method of claim 1, wherein the first received component and the second received component are orthogonal.

47.   The method of claim 1, wherein the first received component and the second received component are non-orthogonal.

48.   A method for compressing received data comprising a received In-phase (I) component, a received Quadrature (Q) component, and a third component, the method comprising the steps of:

(a)   determining a first statistical characteristic associated with the received I component and a second statistical characteristic associated with the received Q component;

(b)   mapping the received I component to one of a first plurality of bins in accordance with the first statistical characteristic in order to form a converted I component, wherein a first resolution of the converted I component is reduced with respect to the received I component;

(c)   mapping the received Q component to one of a second plurality of bins in accordance with the second statistical characteristic in order to form a converted Q component, wherein a second resolution of the converted Q component is reduced with respect to the received Q component;

(d)   transforming the converted I component into a transformed I component and the converted Q component into a transformed Q component;

(e)   quantizing the transformed I component into a quantized I transform and the transformed Q component into a quantized Q transform;

(f)   determining a third statistical characteristic associated with the third component;

(g)   mapping the third component to one of a third plurality of bins in accordance with the third statistical characteristic in order to form a converted third component;

(h)   transforming the converted third component into a transformed third component; and

(i)   quantizing the transformed third component into a quantized third transform.

49.   A method for compressing received data comprising a received In-phase (I) component and a received Quadrature (Q) component, the method comprising the steps of:

(a)   determining a first statistical characteristic associated with the received I component and a second statistical characteristic associated with the received Q component;

(b)   mapping the received I component to one of a first plurality of bins in accordance with the first statistical characteristic in order to form a converted I component, wherein a first resolution of the converted I component is reduced with respect to the received I component;

(c)   mapping the received Q component to one of a second plurality of bins in accordance with the second statistical characteristic in order to form a converted Q component, wherein a second resolution of the converted Q component is reduced with respect to the received Q component;

(d)   transforming the converted I component into a transformed I component and the converted Q component into a transformed Q component; and

(e)   quantizing the transformed I component into a quantized I transform and the transformed Q component into a quantized Q transform, wherein step (e) comprises:

(i)   selecting a quantization conversion table according to a data type associated with the received data; and

(ii)   modifying the transformed I component into the quantized I transform and the transformed Q component into the quantized Q transform according to a corresponding entry of the quantization conversion table.

50.   The method of claim 49, wherein the quantization conversion table is determined by a statistical characterization of the transformed I and Q components.

51.   The method of claim 49, wherein the quantization conversion table is determined by a heuristic process.

52.   The method of claim 49, wherein the quantization conversion table is determined by a statistical characterization of the transformed I and Q components and by a heuristic process.

53.   The method of claim 49, wherein the quantization conversion table is determined by reducing a Measurement and Signature Intelligence (MASINT) product distortion.

54.   A method for compressing received data comprising a received In-phase (I) component and a received Quadrature (Q) component, the method comprising the steps of:

(a)   determining a first statistical characteristic associated with the received I component and a second statistical characteristic associated with the received Q component;

(b)   mapping the received I component to one of a first plurality of bins in accordance with the first statistical characteristic in order to form a converted I component, wherein a first resolution of the converted I component is reduced with respect to the received I component;

(c)   mapping the received Q component to one of a second plurality of bins in accordance with the second statistical characteristic in order to form a converted Q component, wherein a second resolution of the converted Q component is reduced with respect to the received Q component;

(d)   transforming the converted I component into a transformed I component and the converted Q component into a transformed Q component;

(e)   quantizing the transformed I component into a quantized I transform and the transformed Q component into a quantized Q transform;

(f)   encoding the quantized I transform into a compressed I component and the quantized Q transform into a compressed Q component; and

(g)   communicating the compressed I component and the compressed Q component through a transmission medium.

55.   A method for quantizing a transformed In-phase (I) component and a transformed Quadrature (Q) component, the method comprising:

(a)   selecting a quantization conversion table according to a data type associated with received data; and

(b)   modifying the transformed I component into a quantized I transform and the transformed Q component into a quantized Q transform according to a corresponding entry of the quantization conversion table.